

We claim:

1. A scintillator crystal comprising cerium doped lutetium yttrium orthosilicate.

5 2. The crystal of Claim 1 having the general composition of  $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$  where  $x =$  approximately 0.00001 to approximately 0.05 and  $y =$  approximately 0.0001 to approximately 0.9999.

3. The crystal of Claim 1 having a monocrystalline structure.

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4. The crystal of Claim 2 wherein  $x$  ranges from approximately 0.0001 to approximately 0.001 and  $y$  ranges from approximately 0.3 to approximately 0.8.

5. A scintillation detector assembly comprising:

15 a cerium doped lutetium yttrium orthosilicate crystal; and,  
a photon detector coupled to said crystal, whereby an electrical signal is generated in response to a light pulse from said crystal when exposed to a high energy gamma ray.

6. The detector assembly of Claim 5 wherein said crystal is monocrystalline cerium  
20 doped lutetium yttrium orthosilicate.

7. The detector assembly of Claim 6 wherein said crystal has the general composition of  $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$  where  $x =$  approximately 0.00001 to approximately 0.05 and  $y =$  approximately 0.0001 to approximately 0.9999.

8. The detector assembly of Claim 7 wherein x ranges from approximately 0.0001 to approximately 0.001 and y ranges from approximately 0.3 to approximately 0.8.

5 9. The detector assembly of Claim 5 wherein said coupled photon detector is selected from at least one of a photomultiplier tube, a PIN diode and an APFD diode.